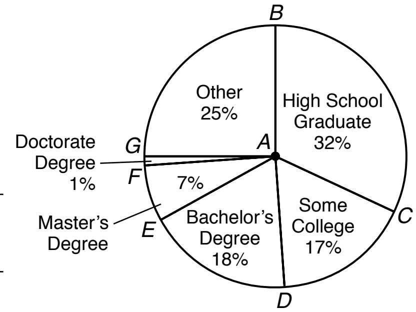
Name ________________________________ Date ____________ Class ____________

LESSON **11-2**

Practice B
Arcs and Chords

The circle graph shows data collected by the U.S. Census Bureau in 2004 on the highest completed educational level for people 25 and older. Use the graph to find each of the following. Round to the nearest tenth if necessary.



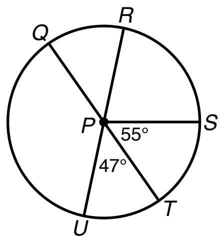
1. $m\angle CAB$ ____________ **2.** $m\angle DAG$ ____________

3. $m\angle EAC$ ____________ **4.** $m\widehat{BG}$ ____________

5. $m\widehat{GF}$ ____________ **6.** $m\widehat{BDE}$ ____________

Find each measure.

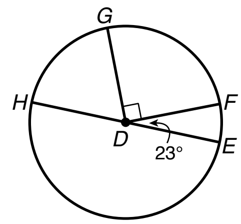
7.



$m\widehat{QS}$ ____________

$m\widehat{RQT}$ ____________

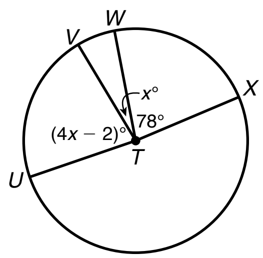
8.



$m\widehat{HG}$ ____________

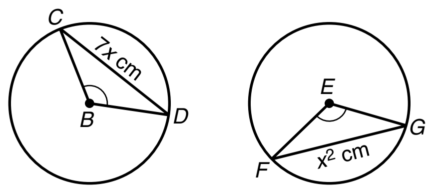
$m\widehat{FEH}$ ____________

9.



Find $m\angle UTW$. ____________

10.

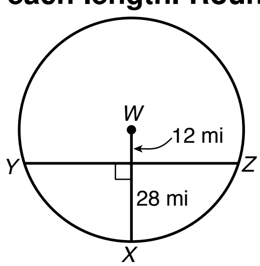


$\odot B \cong \odot E$, and $\angle CBD \cong \angle FEG$.

Find FG. ____________

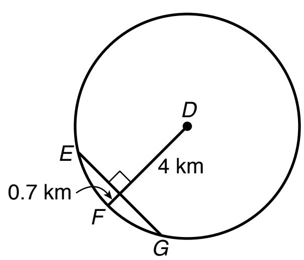
Find each length. Round to the nearest tenth.

11.



ZY ________________________________

12.



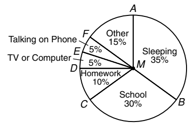
EG ________________________________

LESSON **11-2**

Practice A

Arcs and Chords

The circle graph shows the number of hours Rae spends on each activity in a typical weekday. Use the graph to find each of the following.

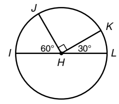


1. $m\angle AMD =$ **90°**
2. $m\angle DMB =$ **144°**
3. $m\widehat{BC} =$ **108°**
4. $m\widehat{CBA} =$ **234°**

In Exercises 5–10, fill in the blanks to complete each postulate or theorem.

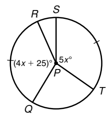
5. In a circle or congruent circles, congruent central angles have congruent **chords**.
6. In a circle or congruent circles, congruent **chords** have congruent arcs.
7. The measure of an arc formed by two **adjacent** arcs is the sum of the measures of the two arcs.
8. In a circle, the **perpendicular bisector** of a chord is a radius (or diameter).
9. In a circle or congruent circles, congruent arcs have congruent **central angles**.
10. In a circle, if the **radius or diameter** is perpendicular to a chord, then it bisects the chord and its arc.

Find each measure.



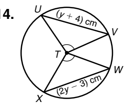
11. $m\widehat{IK} =$ **150°**
12. $m\widehat{JIL} =$ **240°**

13\.



$m\widehat{QR} = m\widehat{ST}$. Find $m\angle QPR$. **125°**

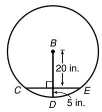
14\.



$\angle UTV \cong \angle XTW$. Find WX. **11 cm**

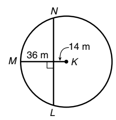
Find the length of each chord. (*Hint:* Use the Pythagorean Theorem to find half the chord length, and then double that to get the answer.)

15\.



$CE =$ **30 in.**

16\.



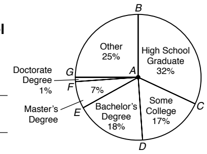
$LN =$ **96 m**

LESSON **11-2**

Practice B

Arcs and Chords

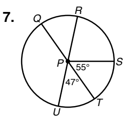
The circle graph shows data collected by the U.S. Census Bureau in 2004 on the highest completed educational level for people 25 and older. Use the graph to find each of the following. Round to the nearest tenth if necessary.



1. $m\angle CAB$ **115.2°**
2. $m\angle DAG$ **93.6°**
3. $m\angle EAC$ **126°**
4. $m\widehat{BG}$ **90°**
5. $m\widehat{GF}$ **3.6°**
6. $m\widehat{BDE}$ **241.2°**

Find each measure.

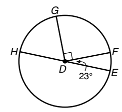
7\.



$m\widehat{QS}$ **125°**

$m\widehat{RQT}$ **227°**

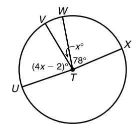
8\.



$m\widehat{HG}$ **67°**

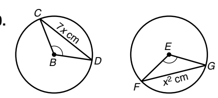
$m\widehat{FEH}$ **203°**

9\.



Find $m\angle UTW$. **102°**

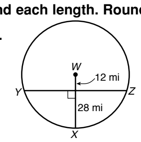
10\.



$\odot B \cong \odot E$, and $\angle CBD \cong \angle FEG$. Find FG. **49 cm**

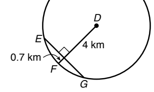
Find each length. Round to the nearest tenth.

11\.



ZY **76.3 mi**

12\.



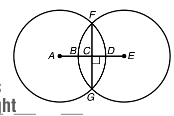
EG **4.9 km**

LESSON **11-2**

Practice C

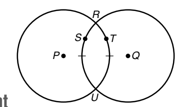
Arcs and Chords

Write proofs for Exercises 1 and 2.



1. **Given:** $\overline{AC} \cong \overline{EC}$, $\overline{AE} \perp \overline{FG}$
   Prove: $\odot A \cong \odot E$

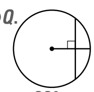
Possible answer: Draw $\overline{AF}$ and $\overline{EF}$. It is given that $\overline{AE}$ is perpendicular to $\overline{FG}$. Therefore $\angle ACF$ and $\angle ECF$ are right angles and are congruent. It is also given that $\overline{AC} \cong \overline{EC}$. $\overline{FC} \cong \overline{FC}$ by the Reflexive Property of Congruence. So $\triangle AFC \cong \triangle EFC$ by SAS. By CPCTC, $\overline{AF} \cong \overline{EF}$. $\overline{AF}$ and $\overline{EF}$ are radii of $\odot A$ and $\odot E$, and circles with congruent radii are congruent circles, so $\odot A \cong \odot E$.



2. **Given:** $\widehat{RSU} \cong \widehat{RTU}$
   Prove: $\odot P \cong \odot Q$

Possible answer: Draw $\overline{RU}$, $\overline{PR}$, $\overline{PU}$, $\overline{QR}$, and $\overline{QU}$. Because $\overline{PR}$ and $\overline{PU}$ are radii of $\odot P$, they are congruent and $\triangle PRU$ is isosceles. Similar reasoning shows that $\triangle QRU$ is also isosceles. By the Base Angles Theorem, $\angle PUR \cong \angle PRU$ and $\angle QRU \cong \angle QUR$. So $m\angle PUR$ and $m\angle PRU$ are each equal to $\frac{1}{2}(180 - m\angle RPU)$. Also, $m\angle QRU$ and $m\angle QUR$ are each equal to $\frac{1}{2}(180 - m\angle RQU)$. It is given that $\widehat{RSU} \cong \widehat{RTU}$, so $m\widehat{RSU} = m\widehat{RTU}$. The measure of an arc is equal to the measure of its central angle, so $m\angle RPU = m\angle RQU$. Substitution shows that $m\angle PUR = m\angle PRU = m\angle QRU = m\angle QUR$. $\overline{RU} \cong \overline{RU}$ by the Reflexive Property of Congruence. So $\triangle PRU \cong \triangle QRU$ by SAS. By CPCTC, $\overline{PR} \cong \overline{QR}$ and circles with congruent radii are congruent circles, so $\odot P \cong \odot Q$.

Give the degree measure of the arc intercepted by the chord described in Exercises 3–8. The figure is given for reference. Round to the nearest tenth if necessary.



3. a chord congruent to the radius **60°**
4. a chord one-third the length of the radius **19.2°**
5. a chord congruent to the segment from the center to the chord **53.1°**
6. a chord twice the length of the segment from the center to the chord **90°**
7. a chord one-fourth the length of the circumference **103.5°**
8. a chord $\frac{1}{\pi}$ multiplied by the length of the circumference **180°**

Find the length of a chord that intercepts an arc of each given measure. Give your answer in terms of the radius *r*. Round to the nearest tenth.

9. 10° **0.2*r***
10. 45° **0.8*r***
11. 136° **1.9*r***

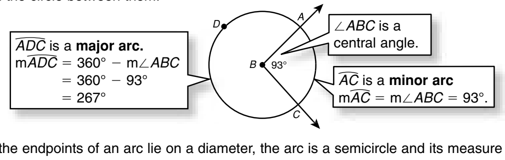
LESSON **11-2**

Reteach

Arcs and Chords

Arcs and Their Measure

- A **central angle** is an angle whose vertex is the center of a circle.
- An **arc** is an unbroken part of a circle consisting of two points on a circle and all the points on the circle between them.

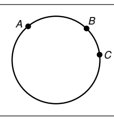


- If the endpoints of an arc lie on a diameter, the arc is a semicircle and its measure is 180°.

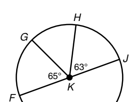
Arc Addition Postulate

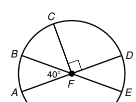
The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

$m\widehat{ABC} = m\widehat{AB} + m\widehat{BC}$

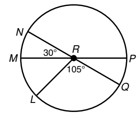


Find each measure.





1. $m\widehat{HJ}$ **63°**
2. $m\widehat{FGH}$ **117°**
3. $m\widehat{CDE}$ **130°**
4. $m\widehat{BCD}$ **140°**



5. $m\widehat{LMN}$ **75°**
6. $m\widehat{LNP}$ **225°**